IntesisBox®

FJ-RC-MBS-1 v.2.2

Modbus RTU (EIA485) Interface for FUJITSU air conditioning units.

User's Manual

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r1.6

Order Code: **FJ-RC-MBS-1**

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1. Presentation



FJ-RC-MBS-1 device

The FJ-RC-MBS-1 interface allows a complete and natural integration of ***FUJITSU*** air conditioning units into Modbus RTU (EIA485) networks.

Main features:

- Reduced dimensions. 93 x 53 x 58 mm.
- Quick and easy installation.
  Mountable on DIN rail, wall, or even inside the indoor unit in some models of AC.
- External power not required.
- Direct connection to Modbus RTU (EIA485) networks. Up to 63 FJ-RC-MBS-1 devices can be connected in the same network (See Figure 1.1).
  FJ-RC-MBS-1 is a Modbus slave device.
- Direct connection to the AC indoor units.
- Configuration from both on-board DIP-switches and Modbus RTU.
- Total Control and Supervision.
- Real states of the AC unit's internal variables.
- Allows using simultaneously the IR and wired remote controls and Modbus RTU.

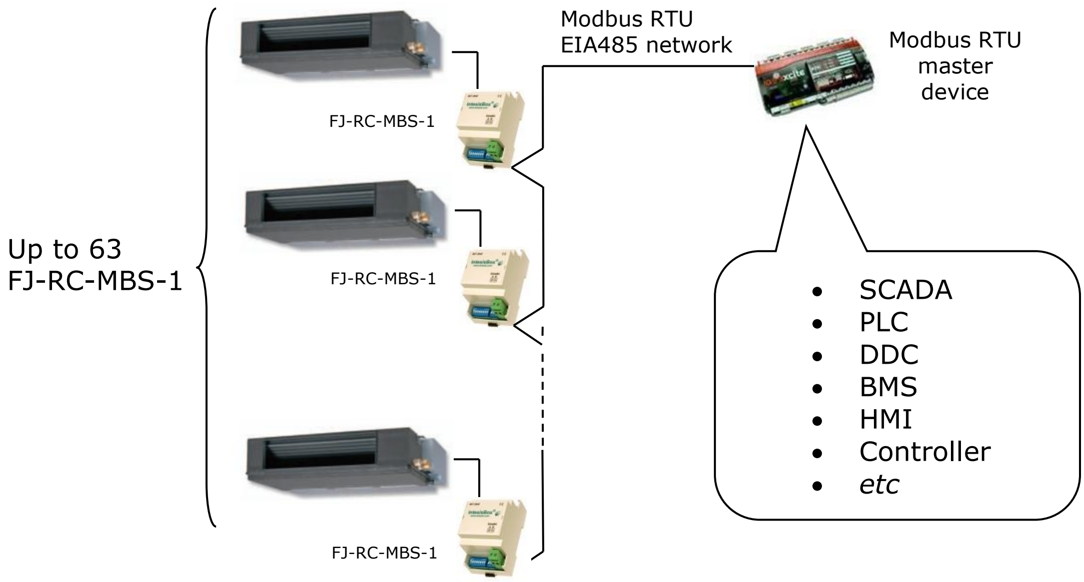


Figure 1.1 FJ-RC-MBS-1 Connection capabilities

2. Connection

2.1 Connection of the interface to the AC indoor unit

The FJ-RC-MBS-1 connects directly to the Fujitsu 3-wire cable bus. Depending on which controllers are available the recommended connection methods are the following (details in Figure 2.1):

- **Wired remote control available**. Connect the gateway as Slave in parallel with the wired remote controllers (Wall controller acts as master).
- **Infrared remote control available**. Connect the gateway as Master.
- **No remote control available** Connect the gateway directly to the 3-wire bus of the indoor unit as Master when there is no FUJITSU remote control.

Disconnect power supply from the AC unit and use a 3-wire cable for the connection of FJ-RC-MBS-1, FUJITSU wired remote controller and its corresponding indoor unit. Screw the suitably peeled cable ends in the corresponding terminals of each device, as summarized in Figure 2.1.

Maximum connection bus length is 500 meters and has polarity.

2.2 Connection of the interface to Modbus

Use the EIA485 connector in the FJ-RC-MBS-1 to connect to the Modbus network.

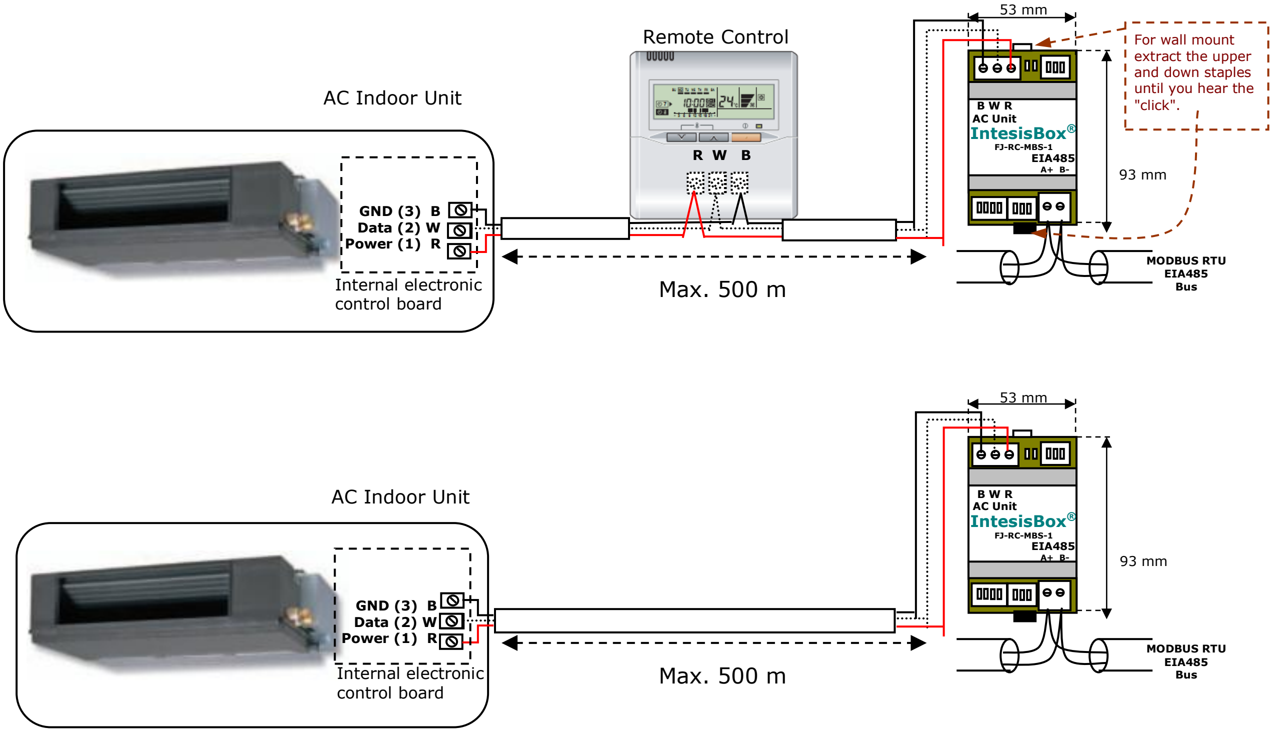


Figure 2.1 FJ-RC-MBS-1 connection diagram

2.3 Power-up

After the FJ-RC-MBS-1 is properly connected, AC unit's main power can be connected again.

Then, it will start an initialization process which can take around 2 minutes before the normal operation starts.

While the initialization is ongoing, some Modbus registers will indicate an undetermined value (see section 3.2). Once the normal operation starts, they will acquire its corresponding value.

It is important to bear in mind that changes made during the initialization process will not have effect until it finishes.

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3. Modbus Interface Specification

3.1 Modbus physical layer

FJ-RC-MBS-1 implements a Modbus RTU (slave) interface, to be connected to an EIA485 line. It performs 8N2 (8N1-compatible) communication (8 data bits, no parity and 2 stop bit) with several available baudrates (2400 bps, 4800 bps, 9600 bps -default- and 19200 bps).

3.2 Modbus Registers

All registers are of type "16-bit unsigned register", in standard Modbus' big endian notation. The registers are accessible as "Holding registers" or "Inputs registers".

3.2.1 Control and status registers

<table>
<tr><th>Register Addr (protocol address)</th><th>Register Addr (PLC address)</th><th>R/W</th><th>Description</th></tr>
<tr><td>0</td><td>1</td><td>R/W</td><td>AC unit On/Off
▪ 0: Off
▪ 1: On</td></tr>
<tr><td>1</td><td>2</td><td>R/W</td><td>AC unit Mode
▪ 0: Auto
▪ 1: Heat
▪ 2: Dry
▪ 3: Fan
▪ 4: Cool</td></tr>
<tr><td>2</td><td>3</td><td>R/W</td><td>AC unit Fan Speed[1]
<table>
<tr><th></th><th colspan="4">Num. of Fan Speeds</th></tr>
<tr><th>Val.</th><th>4 (default)</th><th>3</th><th>2</th><th>1</th></tr>
<tr><td>0</td><td colspan="4">Undetermined</td></tr>
<tr><td>1</td><td>Low</td><td>Low</td><td>Low</td><td>High</td></tr>
<tr><td>2</td><td>Mid</td><td>Mid</td><td>High</td><td>-</td></tr>
<tr><td>3</td><td>High</td><td>High</td><td>-</td><td>-</td></tr>
<tr><td>4</td><td>Powerful</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>3</td><td>4</td><td>R/W</td><td>AC unit Vane Position[1]
▪ 0: Undetermined
▪ 1…4: Pos. 1 … Pos. 4
▪ 10: Swing</td></tr>
<tr><td>4</td><td>5</td><td>R/W</td><td>AC unit Temperature Setpoint[2,3]
▪ 16..30 (ºC) (0 = undetermined)
▪ 61..86 (ºF) (0 = undetermined)</td></tr>
<tr><td>5</td><td>6</td><td>R</td><td>Return Path Temperature [3]
▪ 16..30 (ºC) (0 = undetermined)
▪ 61..86 (ºF) (0 = undetermined)
▪ 0x8000 There is no temperature sent from the Remote controller.</td></tr>
<tr><td>6</td><td>7</td><td>R/W</td><td>Window Contact [4]
▪ 0: Closed
▪ 1: Open</td></tr>
<tr><td>7</td><td>8</td><td>R/W</td><td>Device Disablement [4]
▪ 0: FJ-RC-MBS-1 enabled
▪ 1: FJ-RC-MBS-1 disabled</td></tr>
<tr><td>8</td><td>9</td><td>R/W</td><td>Remote Controller Disablement [4]
▪ 0: Remote Controller enabled
▪ 1: Remote Controller disabled</td></tr>
</table>

[1] Configurable according to Table 3.1
[2] Magnitude for this register can be adjusted through DIP switch (Check Table 3.4)
[3] More information in section 3.5.2
[4] See explanation of this functionality in section 3.5

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Register Addr (protocol address)	Register Addr (PLC address)	R/W	Description
9	10	R/W	AC unit Operation Time [5] ▪ 0..65535 (hours). Counts the time the AC unit is in "On" state.
10	11	R	AC unit Alarm Status ▪ 0: No alarm condition ▪ 1: Alarm condition
11	12	R	Error Code ▪ -1 Communication error. ▪ Other look in section 0
22	23	R/W	External temperature sensor Ranges are manufacturer specific Can be ºC or ºF, x1 or x10 0x8000 (-32768d) means "no input sensor"
23	24	R	AC real setpoint Ranges are manufacturer specific Can be ºC or ºF, x1 or x10
24	25	R	Current AC MAX setpoint Ranges are manufacturer specific Can be ºC or ºF, x1 or x10
25	26	R	Current AC min setpoint Ranges are manufacturer specific Can be ºC or ºF, x1 or x10
26	27	R/W	Vane L/R position ▪ 0 - AUTO; 1-POS1 … 9 - POS9; 10-SWING
27	28	R/W	U/D Vane Pulse ▪ 1 - Pulse
34	35	W	L/R Vane Pulse ▪ 1: Pulse
64	65	R/W	Economy ▪ 0: Not active ▪ 1: Active
65	66	R	Input reference temperature Can be ºC or ºF, x1 or x10

3.2.2 Configuration Registers

Register Address (protocol address)	Register Address (PLC address)	R/W	Description
13	14	R/W	"Open Window" switch-off timeout [6, 7] ▪ 0..30 (minutes) ▪ Factory setting: 30 (minutes)
14	15	R	Modbus RTU baudrate (bps)[7] ▪ 2400, 4800, 9600, 19200
15	16	R	Device's Modbus slave address ▪ 1..63
21	22	R	Max number of fan speeds ▪ 1..4: must be configured according to the number of fan speeds supported by the AC unit
48	49	R	Switch value
49	50	R	Device Identification ▪ FJ-RC-MBS-1: 0x0F00
50	51	R	Software version

[5] This value is stored in non-volatile memory.
[6] Once window contact is open, a count-down to switch off the AC Unit will start from this configured value
[7] Configurable through S3 (See Table 3.3)

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3.3 DIP-switch Configuration Interface

In this section, values of the configuration switches and their meaning are specified:

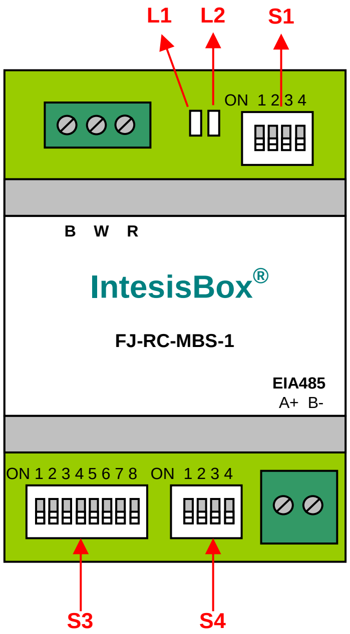


Figure 3.1 FJ-RC-MBS-1

S1 – AC unit configuration: Master/Slave, Slave of Operating Mode and Machine Type

Binary value $b_3 \ldots b_0$	Decimal value	Switches 1 2 3 4	Description
0xxx	0	↓ x x x	Slave (default value) – A FUJITSU Controller must be present in the bus, configured as Master.
1xxx	1	↑ x x x	Master in the bus – FUJITSU Controller not needed in the bus. If existing, it must be configured as Slave.
x0xx	0	x ↓ x x	KEEP SWITCH IN THIS POSISIONT (default value)
x1xx	1	x ↑ x x	DO NOT TURN SWITCH INTO THIS POSITION (not applicable).
xx0x	0	x x ↓ x	Error Type_B (default value)
Xx1x	1	x x ↑ x	Error Type_A
xxx0	0	x x x ↓	KEEP SWITCH IN THIS POSISIONT (default value)
xxx1	1	x x x ↑	DO NOT TURN SWITCH INTO THIS POSITION (not applicable).

Table 3.1 S1 Switch configuration

S3 – Modbus protocol: Slave address and baudrate

Add	Switches 1 2 3 4 5 6 7 8	Add	Switches 1 2 3 4 5 6 7 8	Add	Switches 1 2 3 4 5 6 7 8	Add	Switches 1 2 3 4 5 6 7 8
0	↓ ↓ ↓ ↓ ↓ ↓ x x	16	↓ ↓ ↓ ↓ ↑ ↓ x x	32	↓ ↓ ↓ ↓ ↓ ↑ x x	48	↓ ↓ ↓ ↓ ↑ ↑ x x
1*	↑ ↓ ↓ ↓ ↓ ↓ x x	17	↑ ↓ ↓ ↓ ↑ ↓ x x	33	↑ ↓ ↓ ↓ ↓ ↑ x x	49	↑ ↓ ↓ ↓ ↑ ↑ x x
2	↓ ↑ ↓ ↓ ↓ ↓ x x	18	↓ ↑ ↓ ↓ ↑ ↓ x x	34	↓ ↑ ↓ ↓ ↓ ↑ x x	50	↓ ↑ ↓ ↓ ↑ ↑ x x
3	↑ ↑ ↓ ↓ ↓ ↓ x x	19	↑ ↑ ↓ ↓ ↑ ↓ x x	35	↑ ↑ ↓ ↓ ↓ ↑ x x	51	↑ ↑ ↓ ↓ ↑ ↑ x x
4	↓ ↓ ↑ ↓ ↓ ↓ x x	20	↓ ↓ ↑ ↓ ↑ ↓ x x	36	↓ ↓ ↑ ↓ ↓ ↑ x x	52	↓ ↓ ↑ ↓ ↑ ↑ x x
5	↑ ↓ ↑ ↓ ↓ ↓ x x	21	↑ ↓ ↑ ↓ ↑ ↓ x x	37	↑ ↓ ↑ ↓ ↓ ↑ x x	53	↑ ↓ ↑ ↓ ↑ ↑ x x
6	↓ ↑ ↑ ↓ ↓ ↓ x x	22	↓ ↑ ↑ ↓ ↑ ↓ x x	38	↓ ↑ ↑ ↓ ↓ ↑ x x	54	↓ ↑ ↑ ↓ ↑ ↑ x x
7	↑ ↑ ↑ ↓ ↓ ↓ x x	23	↑ ↑ ↑ ↓ ↑ ↓ x x	39	↑ ↑ ↑ ↓ ↓ ↑ x x	55	↑ ↑ ↑ ↓ ↑ ↑ x x
8	↓ ↓ ↓ ↑ ↓ ↓ x x	24	↓ ↓ ↓ ↑ ↑ ↓ x x	40	↓ ↓ ↓ ↑ ↓ ↑ x x	56	↓ ↓ ↓ ↑ ↑ ↑ x x
9	↑ ↓ ↓ ↑ ↓ ↓ x x	25	↑ ↓ ↓ ↑ ↑ ↓ x x	41	↑ ↓ ↓ ↑ ↓ ↑ x x	57	↑ ↓ ↓ ↑ ↑ ↑ x x
10	↓ ↑ ↓ ↑ ↓ ↓ x x	26	↓ ↑ ↓ ↑ ↑ ↓ x x	42	↓ ↑ ↓ ↑ ↓ ↑ x x	58	↓ ↑ ↓ ↑ ↑ ↑ x x
11	↑ ↑ ↓ ↑ ↓ ↓ x x	27	↑ ↑ ↓ ↑ ↑ ↓ x x	43	↑ ↑ ↓ ↑ ↓ ↑ x x	59	↑ ↑ ↓ ↑ ↑ ↑ x x
12	↓ ↓ ↑ ↑ ↓ ↓ x x	28	↓ ↓ ↑ ↑ ↑ ↓ x x	44	↓ ↓ ↑ ↑ ↓ ↑ x x	60	↓ ↓ ↑ ↑ ↑ ↑ x x
13	↑ ↓ ↑ ↑ ↓ ↓ x x	29	↑ ↓ ↑ ↑ ↑ ↓ x x	45	↑ ↓ ↑ ↑ ↓ ↑ x x	61	↑ ↓ ↑ ↑ ↑ ↑ x x
14	↓ ↑ ↑ ↑ ↓ ↓ x x	30	↓ ↑ ↑ ↑ ↑ ↓ x x	46	↓ ↑ ↑ ↑ ↓ ↑ x x	62	↓ ↑ ↑ ↑ ↑ ↑ x x
15	↑ ↑ ↑ ↑ ↓ ↓ x x	31	↑ ↑ ↑ ↑ ↑ ↓ x x	47	↑ ↑ ↑ ↑ ↓ ↑ x x	63	↑ ↑ ↑ ↑ ↑ ↑ x x

Table 3.2 S3 Modbus Slave address

Binary value $b_0 \ldots b_7$	Decimal value	Switches 1 2 3 4 5 6 7 8	Description
xxxxxx00	0	x x x x x x ↓ ↓	2400bps
xxxxxx10	1	x x x x x x ↑ ↓	4800bps
xxxxxx01	2	x x x x x x ↓ ↑	9600bps (- default value)
xxxxxx11	3	x x x x x x ↑ ↑	19200bps

Table 3.3 S3 Modbus baudrate

S4 – Temperature and termination: Degrees/Decidegrees (x10), temperature magnitude (ºC/ºF), number of fan speeds and EIA485 termination resistor.

Binary value $b_0 \ldots b_3$	Decimal value	Switches 1 2 3 4	Description
0xxx	0	↓ x x x	Temperature values in Modbus register are represented in degrees (x1) (default value)
1xxx	1	↑ x x x	Temperature values in Modbus register are represented in decidegrees (x10)
x0xx	0	x ↓ x x	Temperature values in Modbus register are represented in Celsius degrees (default value)
x1xx	1	x ↑ x x	Temperature values in Modbus register are represented in Fahrenheit degrees
xx0x	0	x x ↓ x	KEEP SWITCH IN THIS POSISIONT (default value)
xx1x	1	x x ↑ x	DO NOT TURN SWITH INTO THIS POSITION (not applicable).
xxx0	0	x x x ↓	EIA485 bus without termination resistor (default value)
xxx1	1	x x x ↑	Internal termination resistor of 120Ω connected to EIA485 bus**

Table 3.4 S4 Temperature and termination configuration

* Default value

** The termination resistor must only be activated in the interfaces connected at both ends of the bus, not in the rest. The EIA485 bus can be biased through internal jumpers JP2 and JP3. See section 3.7.

3.4 Implemented Functions

FJ-RC-MBS-1 implements the following standard Modbus functions:

- 3: Read Holding Registers
- 4: Read Input Registers
- 6: Write Single Register
- 16: Write Multiple Registers (Although this function is allowed, the interface does not allow write operations of more than 1 register with the same request, this means that length field should always be 1 when using this function for writes)

The maximum number of registers that can be read in a single request is 100.

3.5 Special behaviors

3.5.1 Window contact

The FJ-RC-MBS-1 has the functionality of automatically control the turning off of the AC indoor unit depending on the state of the window contact register.

The AC indoor unit will be turned OFF if the window contact register indicates "window opened" for a certain period of time (default value: 30 minutes).

If the AC unit is turned on through either the remote controller or the On/Off register and the window contact is still indicating "window opened", it will restart the countdown of the 30 minutes and after that it will turn OFF the AC unit again.

If the window contact register is indicating "window closed", this functionality will have no effect to the normal operation.

3.5.2 Considerations on FJ-RC-MBS-1 temperature registers

FJ-RC-MBS-1 implements two registers containing temperature values:

- **AC unit Temperature Setpoint (R/W)** (register 5 – in PLC addressing): This is the adjustable temperature setpoint meant to be required by the user. This register can be read (Modbus function 3 or 4) or written (modbus functions 5 or 16). A remote controller connected to the 3-wire bus of the Fujitsu indoor unit will report the same temperature setpoint value as this register.

- **AC unit external reference temperature (R/W)** (register 23 – in PLC addressing): This register allows providing an external temperature reference from Modbus side. If an external temperature is provided through this register, indoor unit will use it as reference for its temperature control loop.

  - This register will have no effect in those Fujitsu RAC / domestic line splits Air-Conditioning units – this is, those models requiring an additional communication accessory enabling communication with FJ-RC-MBS-1.
  - For this temperature to take effect it is required that the Fujitsu AC indoor unit is configured in such a way that it uses the "thermostat sensor in the remote controller" (this is, FJ-RC-MBS-1 will act as thermostat sensor providing a temperature sensor reading).
  - This configuration is done via a Fujitsu remote controller connected to the indoor unit (Function number "42" – setting value "1" / operation of Thermosensor button) and must be done by Fujitsu authorized installers at the time of the installation of the AC.
  - Register value after FJ-RC-MBS-1 startup is -32768, which means that no temperature reference is provided to the AC indoor unit. In that case, AC indoor unit will use its own return path temperature sensor as reference for its control loop.

Additionally, note that temperature values from all these three registers are expressed according to the temperature format configured through its onboard DIP-Switches (See 3.3). Following formats are possible:

- Celsius value: Value in Modbus register is the temperature value in Celsius (i.e. a value "22" in the Modbus register must be interpreted as 22ºC)
- Decicelsius value: Value in Modbus register is the temperature value in decicelsius (i.e. a value "220" in the Modbus register must be interpreted as 22.0ºC)
- Fahrenheit value: Value in Modbus register is the temperature value in Fahrenheit (i.e. a value "72" in the Modbus register must be interpreted as 72ºF (~22ºC).

3.5.3 Device disablement

If the device disablement register is set to 1, it will not allow the FJ-RC-MBS-1 to change the state of the AC unit. All the Modbus registers will show the current state of the AC unit as if they were "Read Only registers".

3.5.4 Remote controller disablement

When the remote controller is disabled, changes made by the remote controller will be corrected by the FJ-RC-MBS-1 setting the previous value. In this way, the FJ-RC-MBS-1 will prevent the remote controller from changing the state of the AC unit.

3.6 Device LED indicator

The device includes two LED indicators (check Figure 3.1) to signal its different possible operational states. Their meaning is explained in this section:

L1 (green)			
Operation	**ON**	**OFF**	**Meaning**
Blinking	500 ms	500 ms	Error
Flashing	100 ms	1900 ms	Normal operation (configured and working)

L2 (red)			
Operation	**ON**	**OFF**	**Meaning**
Pulse	3 sec	--	Undervoltage

L1 (green) & L2 (red)			
Operation	**ON**	**OFF**	**Meaning**
Pulse	5 sec	--	Device start-up
Alternate blinking	500 ms	500 ms	Flash checksum not OK

3.7 EIA485 bus. Termination resistors and Fail Safe Biasing mechanism

EIA485 bus requires a 120Ω terminator resistor at each end of the bus to avoid signal reflections.

The FJ-RC-MBS-1 device includes an on-board terminator resistor of 120Ω that can be connected to the EIA485 bus by using DIP-switch (Table 3.4).

A fail safe biasing circuit has also been included in the board of FJ-RC-MBS-1, it can be connected to the EIA485 bus by placing internal JP1 and 1 jumpers (see details in Figure 3.2). This fail safe biasing of the EIA485 bus must only be supplied by one of the devices connected to the bus.

Some Modbus RTU EIA485 master devices can provide also internal 120Ω terminator resistor and/or fail safe biasing (consult the technical documentation of the master device connected to the EIA485 network in every case).

Location of jumper and DIP-switches for EIA485 bus Termination resistor or Fail Safe Biasing selection:

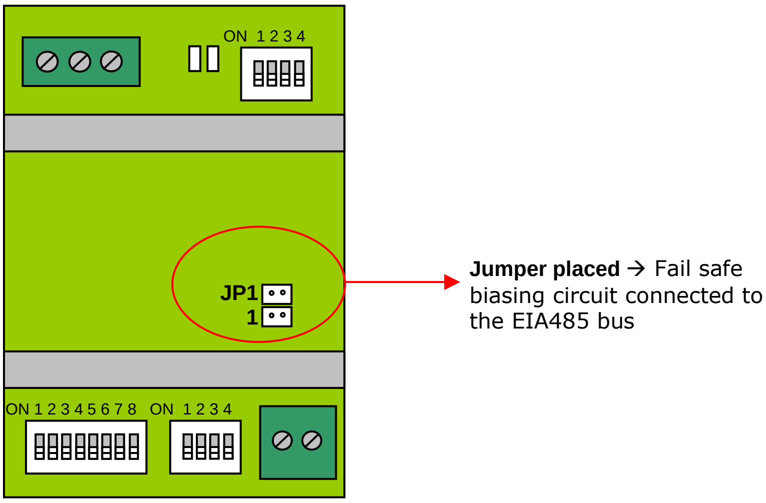


Figure 3.2 Fail Safe jumper

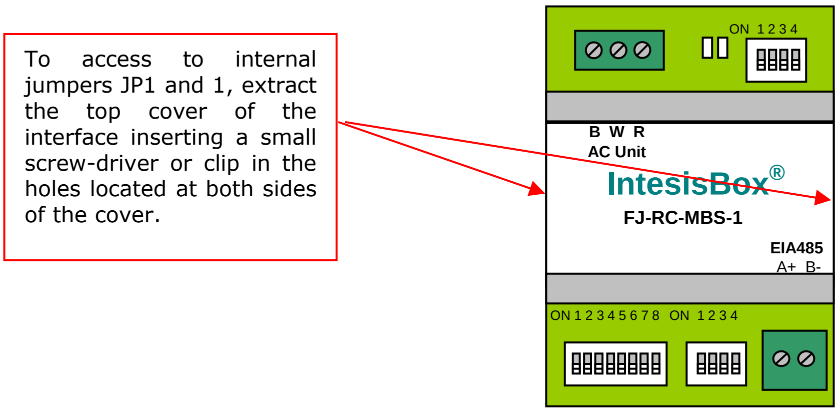


Figure 3.3 Accessing the jumper

4. Specifications

Dimensions:	*93 x 53 x 58 mm*
Weight:	*85 g*
Consumption Current:	*80 mA*
Operating Temperature:	*0 . . . 40ºC*
Stock Temperature:	*-40 . . . 85ºC*
Operating Humidity:	*<95% RH, non-condensing*
Stock Humidity:	*<95% RH, non-condensing*
Isolation voltage:	*1000 VDC*
Isolation resistance:	*1000 MΩ*
Modbus Media:	*Compatible with Modbus RTU - EIA485 networks*

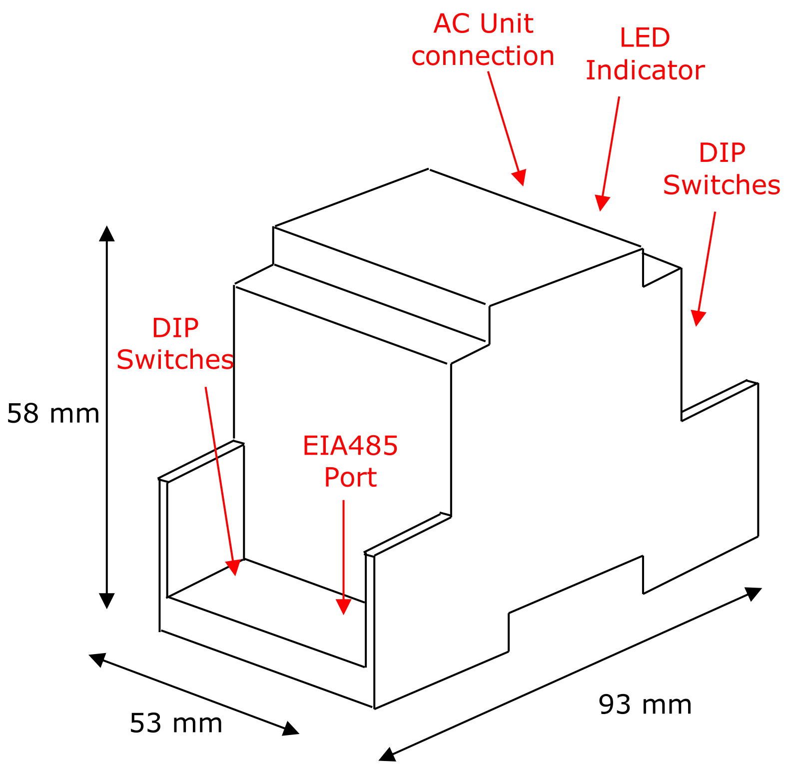


Figure 4.1 FJ-RC-MBS-1 external sketch

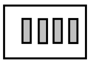
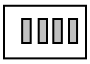
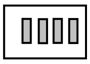
5. AC Unit Types Compatibility

A list of FUJITSU indoor unit model references compatible with FJ-RC-MBS-1 and their available features can be found in:

http://www.intesis.com/pdf/IntesisBox_FJ-RC-xxx-1_AC_Compatibility.pdf

6. Error Codes

In order to get the right values regarding AC error codes, remember that you have to select the proper switch configuration. Find below a summary table of the different AC systems and the switch configuration for each of them to be selected.

AC System Type	Switch configuration (S1)	Error section
RAC non inverter models RAC inverter models	 (x x ↑ x)	**6.1**
VRF V / S / J	 (x x ↑ x)	**6.2**
RAC inverter model G* series VRF J-II / V-II / VR-II	 (x x ↓ x)	**6.1**

* G series stands for units that include a 'G' just before the power number in its reference. E.g.: ASY**G**09LTCA

NOTE: Devices with Software Version (register 51 in PLC-addresses) 2.1 and below connected to *RAC inverter model G series* or *VRF J-II / V-II / VR-II series* will need to add 100 to the error code prompted. That is, if error prompted is 17, the corresponding error in the list below might be 17+100 = 117.

6.1 RAC and VRF J-II / V-II / VR-II series

Error in Modbus	Error in Remote Controller	Error Description	AC System Type
0	**00**	Wired remote controller error	**RAC** Inverter and Non Inverter
1	**01**	Indoor signal error	
2	**02**	Indoor room temperature sensor error	
3	**03**	Indoor room temperature sensor error	
4	**04**	Indoor heat exchanger temperature sensor (middle) error	
5	**05**	Indoor heat exchanger temperature sensor (middle) error	
6	**06**	Outdoor heat exchanger temperature sensor (outlet) error	
7	**07**	Outdoor heat exchanger temperature sensor (outlet) error	
8	**08**	Power voltage error	
9	**09**	Float switch operated	
10	**0A**	Outdoor temperature sensor error	
11	**0b**	Outdoor temperature sensor error	
12	**0C**	Outdoor discharge pipe temperature sensor error	
13	**0d**	Outdoor discharge pipe temperature sensor error	
14	**0E**	Heat sink thermistor (Inverter) error	
15	**0F**	Discharge temperature error	
17	**11**	Indoor unit EEPROM error	
18	**12**	Indoor fan error	
19	**13**	Indoor signal error	
20	**14**	Outdoor EEPROM error	
21	**15**	Compressor temperature sensor error	
22	**16**	Pressure switch abnormal, Pressure sensor error	
23	**17**	IPM protection	
24	**18**	CT error	
25	**19**	Active filter error INV voltage protection	
26	**1A**	Compressor location error	
27	**1b**	Outdoor fan error	
28	**1C**	Outdoor unit computer communication error	
29	**1d**	2-way valve temperature sensor error	
30	**1E**	3-way valve temperature sensor error	
31	**1F**	Connected indoor unit error	
32	**20**	Indoor MANUAL AUTO switch error	
33	**21**	reverse VDD permanent stop protection	
34	**22**	VDD permanent stop protection	
36	**24**	Excessive high pressure protection on cooling	
37	**25**	P.F.C. circuit error	
38	**26**	Indoor signal error	
39	**27**	Indoor signal error	
40	**28**	Indoor heat exchanger temperature sensor (inlet) error	
41	**29**	Outdoor heat exchanger temperature sensor (middle) error	
42	**2A**	Power supply frequency detection error	

43	**2b**	Compressor temperature error	
44	**2C**	4-way valve error	
45	**2d**	Heat sink thermistor P.F.C. error	
46	**2E**	Indoor unit damper error Inverter error	
47	**2F**	Low pressure error	
48	**30**	Refrigerant circuit address set-up error	
49	**31**	Master unit, Slave unit set-up error	
50	**32**	Connected the indoor number set-up error	
51	**33**	P.F.C. printed circuit board error	
52	**34**	Indoor fan 2 error	
53	**35**	Control box thermistor error	
54	**36**	Indoor unit CT error	
55	**37**	Indoor fan motor 1 driving circuit error	
56	**38**	Indoor fan motor 2 driving circuit error	
117	**11**	Serial communication error between indoor/outdoor units	**RAC** Inverter models G series **VRF** J-II / V-II / VR-II Series
118	**12**	Remote controller communication error	
119	**13**	Communication error between outdoor units	
120	**14**	Network communication error	
121	**15**	Scan error	
122	**16**	Peripheral unit communication error	
123	**17**	Electricity charge apportionment error	
133	**21**	Indoor unit initial setting error	
134	**22**	Indoor unit capacity abnormal	
135	**23**	Incompatible series connection error	
136	**24**	Connection unit number error	
137	**25**	Connection pipe length error	
138	**26**	Indoor unit address setting error	
139	**27**	Master/slave unit setting error	
140	**28**	Other setting error	
141	**29**	Connection unit number error in wired remote controller system	
149	**31**	Indoor unit power supply abnormal	
150	**32**	Indoor unit main PCB error	
151	**33**	Indoor unit display PCB error	
152	**34**	Power relay error	
153	**35**	Indoor unit manual auto switch error	
154	**36**	Heater relay error	
155	**37**	Indoor unit transmission PCB error	
156	**38**	Network convertor PCB error	
157	**39**	Indoor unit power supply circuit error	
158	**3A**	Indoor unit communication circuit (wired remote controller) error	
165	**41**	Indoor unit room temp. thermistor error	
166	**42**	Indoor unit heat ex. temp. thermistor error	
167	**43**	Humidity sensor error	
168	**44**	Light sensor error	
169	**45**	Gas sensor error	
170	**46**	Float sensor error	
171	**47**	Water temperature sensor error	
172	**48**	Warm water flow rate sensor error	
173	**49**	Heater sensor error	
181	**51**	Indoor unit fan motor 1 error	
182	**52**	Indoor unit coil (expansion valve) error	
183	**53**	Indoor unit water drain abnormal	
184	**54**	Air cleaning function error	
185	**55**	Filter cleaning function error	
186	**56**	Water circulation pump error	
187	**57**	Indoor unit damper error	
188	**58**	Indoor unit intake grille position error	
189	**59**	Indoor unit fan motor 2 error	
195	**5U**	Indoor unit miscellaneous error	
197	**61**	Outdoor unit power supply abnormal	
198	**62**	Outdoor unit main PCB error	
199	**63**	Outdoor unit inverter PCB error	
200	**64**	Outdoor unit active filter/PFC circuit error	
201	**65**	Outdoor unit IPM error	
202	**66**	Convertor distinction error	
203	**67**	Outdoor unit power short interruption error (protective operation)	
204	**68**	Outdoor unit magnetic relay error	
205	**69**	Outdoor unit transmission PCB error	
206	**6A**	Outdoor unit display PCB error	
213	**71**	Outdoor unit discharge temp. thermistor error	
214	**72**	Outdoor unit compressor temp. thermistor error	
215	**73**	Outdoor unit heat ex. temp. thermistor error	
216	**74**	Outside air temp. thermistor error	
217	**75**	Outdoor unit suction gas temp. thermistor error	
218	**76**	Outdoor unit operating valve thermistor error	
219	**77**	Outdoor unit heat sink temp. thermistor error	
220	**78**	Expansion valve temperature sensor error	
229	**81**	Receiver liquid level detection sensor error	
230	**82**	Outdoor unit sub-cool heat ex. gas temp. thermistor error	
231	**83**	Outdoor unit liquid pipe temp. thermistor error	
232	**84**	Outdoor unit current sensor error	
233	**85**	Fan motor current sensor error	

234	86	Outdoor unit pressure sensor error	
235	87	Oil sensor error	
245	91	Outdoor unit compressor 1 error	
246	92	Outdoor unit compressor 2 error	
247	93	Outdoor unit compressor start up error	
248	94	Outdoor unit trip detection	
249	95	Outdoor unit compressor motor control error	
250	96	Open loop error(Field-weakening relevant)	
251	97	Outdoor unit fan motor 1 error	
252	98	Outdoor unit fan motor 2 error	
253	99	Outdoor unit 4-way valve error	
254	9A	Outdoor unit coil (expansion valve) error	
259	9U	Outdoor unit miscellaneous error	
261	A1	Outdoor unit discharge temperature 1 error	
262	A2	Outdoor unit discharge temperature 2 error	
263	A3	Outdoor unit compressor temperature error	
264	A4	Outdoor unit pressure error 1	
265	A5	Outdoor unit pressure error 2	
266	A6	Outdoor unit heat exchanger temperature error	
267	A7	Suction temperature abnormal	
268	A8	Poor refrigerant circulation	
269	A9	Current overload error	**RAC** Inverter models G series **VRF** J-II / V-II / VR-II Series
270	AA	Outdoor unit special operation error	
271	AC	Ambient temperature error	
272	AF	Out of the possible operation range	
273	AJ	Freeze protection operated	
277	C1	Peripheral unit main PCB error	
278	C2	Peripheral unit transmission PCB error	
279	C3	Peripheral unit PCB 1 error	
280	C4	PCB 2 error	
281	C5	PCB 3 error	
282	C6	PCB 4 error	
283	C7	PCB 5 error	
284	C8	Peripheral unit input device error	
285	C9	Display device error	
286	CA	EEPROM error	
287	CC	Peripheral unit sensor error	
288	CF	Peripheral unit external connector error (USB memory)	
289	CJ	Other parts error	
293	F1	System tool software error	
294	F2	System tool adaptor error	
295	F3	System tool interface error	
296	F4	System tool environment error	
309	J1	RB unit error	
310	J2	Branch boxes error	
311	J3	Total heat exchanging, ventilation unit error	
312	J4	Domestic hot water unit error	
313	J5	Zone control interface error	

6.2 VRF V / S / J series

Error in Modbus	Error in Remote Controller	Error Description	
0	00	No Error	
2	02	Model information Error	
4	04	Power frequency Error	
6	06	EEPROM access Error	
7	07	EEPROM deletion Error	
9	09	Room sensor Error	
10	0A	Heat Ex. Middle Sensor Error	
11	0b	Heat Ex. Inlet sensor Error	
12	0C	Heat Ex. Outlet sensor Error	**VRF** V / S / J series
13	0d	Blower temperature thermistor Error	
17	11	Drain Error	
18	12	Room temperature Error	
19	13	Indoor fan motor Error	
20	18	Standard wired remote Error	
		Standard wired token Error	
31	1F	Network communication Error	
32	20	Node setting error	
33	21	Communication Error between Main PCB & Transmission PCB	
34	32	Outdoor unit Error	

In case you detect an error code not listed in any of the different tables above, please contact your nearest FUJITSU technical support service.

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